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Surgical Treatment of a Tibial Osteochondral Defect With Debridement, Marrow Stimulation, and Micronized Allograft Cartilage Matrix: Report of an All-Arthroscopic Technique

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ABSTRACT

Although talar dome osteochondral lesions (OCLs) are common injuries, OCLs of the tibial plafond are relatively infrequent. These lesions have historically been managed in a similar manner to talar OCLs, with most treated with debridement and marrow stimulation. This treatment has had mixed results. The present case report describes a patient who underwent an all-arthroscopic surgical technique consisting of debridement and marrow stimulation with application of micronized allograft cartilage matrix (BioCartilage™, Arthrex, Naples, FL).

Osteochondral lesions (OCLs) of the talus are well-known injuries and a common cause of ankle pain. OLCs of the tibia are much less frequent but, historically, they have been treated similarly to talar lesions. The treatment of these lesions has continued to evolve, however, and arthroscopic debridement with marrow stimulation is now routine and can yield favorable results. However, because the final reparative tissue achieved with marrow stimulation procedures is fibrocartilage in nature, the results have been shown to deteriorate over time.

An optimal technique for repair of an OCL would be single-staged and all-arthroscopic, have minimal morbidity, and produce more durable tissue that more closely resembles articular cartilage. The technique described in this report is based on basic scientific research and takes advantage of accepted arthroscopic marrow stimulation techniques. It is therefore a potentially useful procedure that should be considered by surgeons treating OCLs. To the best of the author's knowledge, this is also the first reported case wherein a distal tibial bearing surface OCL was treated arthroscopically and with the use of a micronized allograft cartilage matrix.

Case Report

The patient was a healthy 35-year-old female nurse with a 10-year history of ankle pain without a history of trauma. She was treated from October 2012 to March 2014. Her pain was located about the anterior aspect of the ankle and significantly limited her ability to participate in athletic activity.

On physical examination, she had neutral alignment of her ankle and hindfoot. A slight ankle effusion was noted. Her range of motion was normal; however, it was painful throughout the arc of motion. She was tender to palpation about the anterolateral aspect of the ankle. She presented to the office with a magnetic resonance imaging study, which showed a 5 mm × 5 mm × 10 mm OCL of the lateral aspect of the tibial plafond (Fig. 1*A* and *B*).

She had been previously evaluated and treated conservatively by multiple other orthopedic surgeons. The failed conservative measures included immobilization, steroid injections, and nonsteroidal anti-inflammatory drugs. Surgical intervention was recommended at this point.

The patient underwent went general anesthesia. She was placed in the supine position and in a well-padded thigh holder to serve as a fulcrum for the external distraction device. The lower extremity was prepared and draped in the standard sterile fashion, exsanguinated, and then placed in the external distraction device. Next, 10 mL of fluid was injected intra-articularly to distend the ankle. The anteromedial ankle arthroscopy portal was established in the routine fashion, and global arthroscopy was performed. The OCL was identified about the lateral tibial plafond (Fig. 2). The anterolateral portal was established using needle localization and a "nick

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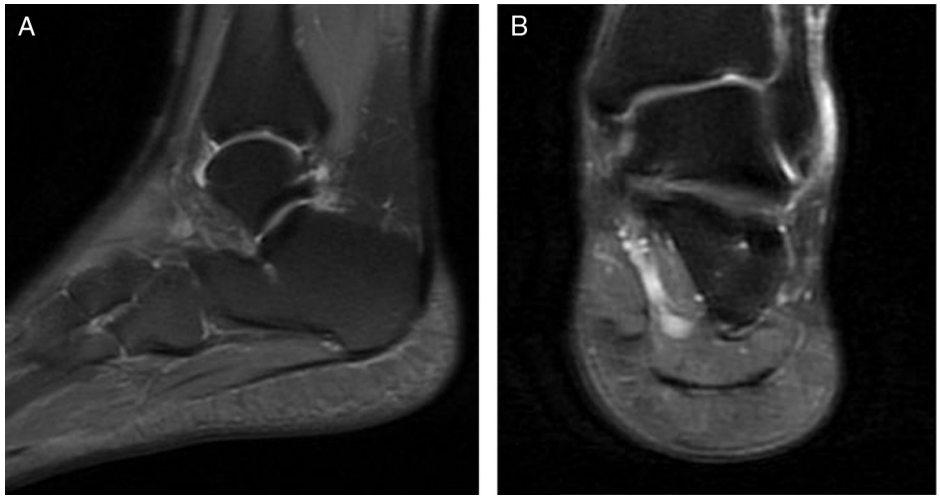

Fig. 1. (*A* and *B*) Magnetic resonance image of tibial osteochondral lesion. Magnetic resonance image displaying the tibial osteochondral lesion about the anterolateral tibial plafond.

Fig. 2. Arthroscopic image of tibial osteochondral lesion of anterolateral tibial plafond.

and spread" technique. The OCL was probed, and the articular cartilage surface and subchondral bone were found to be unstable (Fig. 3*A*). The unstable articular cartilage and subchondral bone was debrided to its base using a curette and shaver (Figs. 3*B* and 4*A* and *B*). Care was taken to create vertical edges at the periphery of the lesion. An arthroscopic awl was then used to perform marrow stimulation at the base of the lesion, and a bleeding response was obtained (Fig. 5). Next, all arthroscopic fluid was aspirated from the joint. The OCL was then further dried with the use of multiple pledgets. This step is essential, because a wet environment will make application of the BioCartilage™ (Arthrex, Naples, FL) very difficult. The micronized allograft cartilage matrix is then combined with an autologous blood solution and mixed in the mixing syringe. The mixture was then delivered into the lesion using a Tuohy needle. The substance was then contoured to the lesion with the use of an elevator (Fig. 6*A* and *B*). A thin layer of fibrin sealant was then applied through a dual-lumen applicator tip to the surface of the lesion. The fibrin sealant was allowed to set for 5 minutes without manipulation of the ankle. The wounds were closed with 3-0 nonabsorbable suture. The leg was then removed from the external distraction device and placed in a bulky splint.

The patient was kept strictly non-weightbearing for 6 weeks in accordance with my protocol. Range of motion exercises were allowed

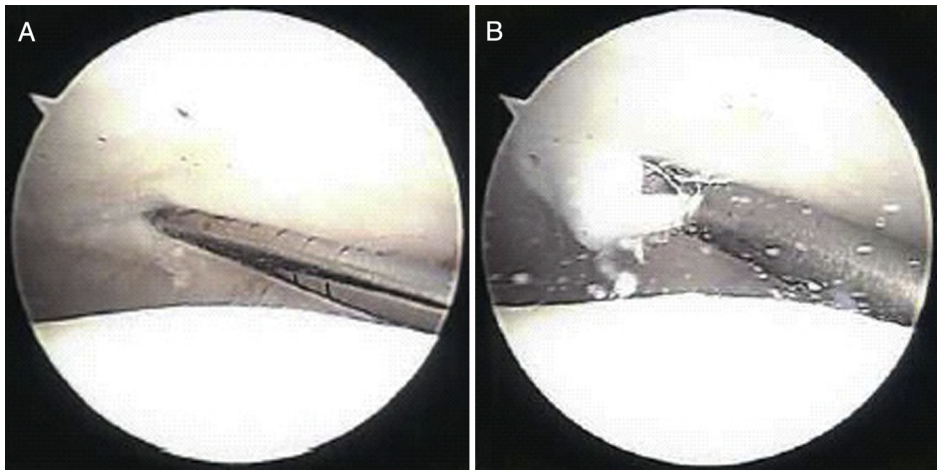

Fig. 3. (*A* and *B*) Probing of the osteochondral lesion. The osteochondral lesion was probed and found to have an unstable articular surface.